

STEREO MOC Status Report
Time Period: 2017:002 - 2017:008

STEREO Ahead (STA) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- On day 002, during the DSS-14 support, turbo decoder lock was lost intermittently beginning at 1711z through 1737z due to weather. This anomaly resulted in the loss of 16,382 frames of SSR data or 3.4 minutes of SSR playback data for each instrument. See DR# N110429 for more information.
- On day 003, during the DSS-25 support, real-time data was lost between 1715z and 1717z due to a delayed failover from the Data Capture and Delivery system (DCD1) to DCD2 at the DSN. All SSR data was recovered. See DR #G117717 for more information.
- On day 004, the primary Ahead command workstation in the MOC failed due to a hard disk failure at 0030z. The MOC switched to the backup command workstation at 0050z. The use of the backup command workstation required some reconfiguration for instrument teams to continue receiving real-time telemetry as a different real-time stream, #107, is being used. A replacement hard disk should arrive this week.
- On day 004, during the DSS-43 support, turbo decoder lock was lost intermittently between 0920z and 0930z. This anomaly resulted in the loss of 2481 frames of SSR data. See DR #N110441 for more information.
- On day 005, the MOC received notification from the DSN that the leap second was applied late, on day 004, at Goldstone. This affected the first three days of tracking data, telemetry data, and timekeeping processing. The DSN is correcting the tracking data for Navigation. Specifically for the telemetry data, the ground receipt time in the header of each packet in the level zero data is off by one second. Note that the spacecraft time in each packet is correct. The science teams indicated that this error did not affect science data processing or analysis. The impact

to the timekeeping processing was that 5 days of the timekeeping history data product were not produced.

- On day 006, automated retrieval of DSN schedules and viewperiods stopped due to an SPS hardware upgrade. DSN schedules are being retrieved manually until the SPS issue is resolved.
- On day 008, during the DSS-63 support, turbo decoder lock was lost briefly at 1015z. This anomaly resulted in the loss of 19 frames of SSR data.

2. The following spacecraft/instrument events occurred during this week. The Ahead observatory operated nominally during this week.

- The average daily science data return for Ahead was 4.8 Gbits during this week.

STEREO Behind (STB) Status:

1. Detailed status of the recovery activities this week to restore operations is listed below.

- None.

2. The Behind loss of communication anomaly occurred on October 1, 2014. Post superior solar conjunction, recovery operations resumed on November 30, 2015. By implementing the NASA Failure Review Board recommendations, the first recovery attempt began with carrier detection by the DSN on August 21st, through September 23, 2016. At a spacecraft range of ~2 AU, the observatory was found to be rotating slowly about its principal axis of inertia for which the uncontrolled attitude allowed some solar array input and continuous uplink and downlink communications on the LGA at emergency data rates. Over the next 22 continuous days, significant obstacles to recovery were overcome with a collaborative effort of the JHU/APL engineering team, NASA GSFC, DSN, FDF, SSMO scheduling, and Mission Operations teams. This consisted of:

- Reliably commanding a rotating spacecraft with uncontrolled attitude at a distance of 2 AU
- How to power on the spacecraft that was never designed to be off without collapsing the battery voltage

- Acquiring telemetry at 35 bps from a spacecraft that is rotating with an uncontrolled attitude
- Warming a frozen propulsion subsystem with a degraded battery and limited solar array input with an uncontrolled attitude
- Configuring, loading, and verifying EA, C&DH, and G&C parameters and macros with very limited telemetry
- Conducting an autonomous momentum dump in the blind and transitioning to C&DH standby mode and successfully receiving telemetry on the HGA indicating star tracker lock and decreasing system momentum.

However, system momentum level remained above the threshold for re-establishing attitude control with the reaction wheels. Due to the uncontrolled attitude, communication degraded and the last detection of the carrier was on September 23rd.

Behind Observatory Status - From the last telemetry received on September 18th, main bus voltage is low, 2 out of 11 battery cells are currently not functioning, attitude remains uncontrolled, rotating at a ~45 second period about its principal axis of inertia. While propellant is suspected to be frozen, last telemetry indicated both propulsion tank latch valves are open and pressure transducer #2 is not functioning. EA mode is enabled. The battery charge rate is C/10. Necessary macro sequences have been tested to allow the peak power tracker in C&DH standby mode to protect the battery. These macro sequences will be loaded to EEPROM when the communications supports longer commands.

Monthly recovery efforts consist of attempting to power on the transmitter for 30 minutes. If no carrier signal is detected, battery recovery operations will commence which consist of repeatedly sweeping a 3 kHz uplink range and sending commands for IEM switched power and PDU 1553 interface bus off. The next recovery tracks are on January 20th, 21st, and 22nd.